What is claimed is:

1. A remote-plasma atomic film deposition apparatus comprising:

a reaction chamber in which wafers are loaded;

an exhaust line for exhausting gas from the reaction chamber;

a first reactive gas supply unit for selectively supplying a first reactive gas to the reactant chamber or the exhaust line;

a first reactive gas transfer line for connecting the first reactive gas supply unit and the reactant chamber;

a first bypass line for connecting the first reactive gas supply line and the exhaust line;

a radical supply unit for generating corresponding radicals by applying plasma to a second reactive gas and then selectively supplying the radicals to the reactant chamber or the exhaust line;

a radical transfer line for connecting the radical supply unit and the reactant chamber;

a second bypass line for connecting the radical supply unit and the exhaust line; and

a main purge gas supply unit for supplying a main purge gas to the first reactant transfer line and/or the radical transfer line.

2. The apparatus of claim 1, wherein the first reactive gas supply unit comprises:

a source container filled with a predetermined amount of liquid first reactant which will be the first reactive gas;

an MFC 1 for controlling the flow rate of an inert gas fed into the source container; and

a first path conversion unit for enabling the inert gas or the first reactive gas to selectively flow into the first reactive gas transfer line or the first bypass line.

3. The apparatus of claim 1, wherein the radical supply unit comprises:

an MFC 2 for controlling the flow rate of the second reactive gas;

an MFC 3 for controlling the flow rate of the inert gas;

a remote plasma generator into which the second reactive gas and/or the inert gas are fed by way of the MFC 2 and the MFC 3 and for generating corresponding radicals by applying plasma to the second reactive gas; and

a second path conversion unit for enabling the generated radicals to selectively flow into the radical transfer line and/or the second bypass line.

4. The apparatus of claim 3, wherein the radical supply unit further comprises a third bypass line for enabling the second reactive gas to selectively flow through the MFC 2 into the second bypass line.

5. The apparatus of claim 1, wherein the main purge gas supply unit comprises:

an MFC 4 for controlling the flow rate of the main purge gas; and

a third path conversion unit for enabling the main purge gas to flow into the first reactive gas transfer line or the radical transfer line.

6. An atomic film deposition method using the remote-plasma atomic film deposition apparatus of one of claims 1 through 5, the method comprising:

forming a thin film on a substrate loaded in the reaction chamber by repeatedly performing a first reactive gas feeding step in which the first reactive gas is fed into the reactant chamber and a first reactive gas purge step in which the first reactive gas, fed into the reactant chamber, is purged, in a state where a luffing valve positioned between the reactant chamber and the exhaust line remains open, gases flowing

through an inner point A of the first path conversion unit and an inner point B of the second path conversion unit continue to flow into the reactant chamber or bypass lines, and radicals are fed into the reactant chamber.

7. The method of claim 6, after depositing a thin film, further comprising injecting radicals and an inert gas into the reactant chamber to thermally treat the thin film, wherein the radicals are formed of at least one selected from the group consisting of O, N, H, OH, and NH and a combination thereof.

8. An atomic film deposition method using the remote-plasma atomic film deposition apparatus of one of claims 1 through 5, the method comprising:

forming a thin film on a substrate loaded in a reaction chamber by repeatedly performing a radical feeding step in which radicals are fed into the reactant chamber, a radical purge step in which the radicals are purged from the reaction chamber, a first reactive gas feeding step in which the first reactive gas is fed into the reactant chamber, and a first reactive gas purge step in which the first reactive gas, fed into the reactant chamber, is purged, in a state where a luffing valve positioned between the reactant chamber and the exhaust line remains open, and gases flowing through an inner point A of the first path conversion unit, an inner point B of the second path conversion unit, and an inner point C of the third path conversion unit continue to flow into the reactant chamber or bypass lines,

wherein the radical purge step comprises injecting the main purge gas, the flow rate of which is controlled by the MFC 4 of the main purge gas supply unit, into the reaction chamber by way of the radical transfer line.

9. The method of claim 8, wherein the sum of the flow rate of the inert gas flowing through the first reactive gas transfer line and the radical transfer line is maintained at a constant level during the first reactive gas purge step.

10. The method of claim 8, after depositing a thin film, further comprising injecting radicals and an inert gas into the reactant chamber to thermally treat the thin film, wherein the radicals are formed of at least one selected from the group consisting of O, N, H, OH, and NH and a combination thereof.

11. An atomic film deposition method using the remote-plasma atomic film deposition apparatus of one of claims 1 through 5, the method comprising:

forming a thin film on a substrate loaded in the reaction chamber by repeatedly performing a radical feeding step in which radicals are fed into the reaction chamber, a radical purge step in which the radicals are purged from the reaction chamber, a first reactive gas feeding step in which the first reactive gas is fed into the reaction chamber, and a first reactive gas purge step in which the first reactive gas is purged from the reactant chamber, in a state where a luffing valve positioned between the reactant chamber and the exhaust line remains open and gases flowing through an inner point A of the first path conversion unit and an inner point D of the radical supply unit continue to flow into the reactant chamber or bypass lines,

wherein the radical purge step comprises injecting only the inert gas (excluding the second reactive gas), the flow rate of which is controlled by the MFC 3 of the radical supply unit, into the reaction chamber by way of the radical transfer line.

12. The method of claim 11, wherein the sum of the flow rate of

the inert gas flowing through the first reactive gas transfer line and the radical transfer line is maintained at a constant level during the first reactive gas purge step.

13. The method of claim 13, after depositing a thin film, further comprising injecting radicals and an inert gas into the reactant chamber to thermally treat the thin film, wherein the radicals are formed of at least one selected from the group consisting of O, N, H, OH, and NH and a combination thereof.